Emphysematous Gastritis on Computed Tomography

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A 67 years old Omani man with multiple comorbidities of diabetes, hypertension, ischemic heart disease, recurrent urosepsis and a bedridden on permanent suprapubic catheterization due to previous history of spinal trauma and surgery presented to the emergency department, Sultan Qaboos University Hospital (SQUH), in 2017 with a complaint of acute onset of severe abdominal pain, abdominal distention and multiple episodes of vomiting for two days. The pain was localized in the epigastric region with mild localized tenderness. His vitals were within normal. He had a temperature of 37 °C, pulse of 80 beats per minut, blood pressure of 125/75 mmHg, and oxygen saturation of 98% on room air. Initial workup showed white blood cell count of 12,000/microliter and normal lipase level. Plain radiograph of the abdomen showed a grossly distended stomach without signs of pneumoperitoneum or small bowel obstruction. Computed Tomography (CT) scan of the abdomen was requested to exclude the possibility of gastric outlet obstruction. It showed extensive intramural air involving the stomach with multiple air loculi seen within the draining perigastric and intrahepatic portal veins. Emergent exploratory laparotomy was done as the patient condition deteriorated, It showed completely gangrenous stomach. A total gastrectomy was performed. The patient, was kept in the intensive care unit and treated with sepsis protocol, later recovered. The histopathology report revealed emphysematous gastritis with acute ischemic infarction. Literature review shows few case reports of this condition. We report a CT findings of emphysematous gastritis associated with gastric infarction.
in a diabetic patient. It is the first case of emphysematous gastritis reported in SQUH using only radiological modality.

Comment:
Emphysematous gastritis is a rare and potentially lethal condition which requires prompt diagnosis and urgent aggressive management.\(^1\) However, the presentation can be overlapped with other diagnosis like gastric emphysema and gastric ischemia.\(^2\) Differentiation is very crucial between these as the management and prognosis will also be different. History of diabetes, ingestion of alcohol or corrosive material, adenocarcinoma of the stomach, peptic ulcer, infarction, trauma, or invasion of submucosa by gas-forming organism are considered to be predisposing factors to this condition.\(^1,3\) The literature shows that commonly isolated organisms are Streptococci, Escherichia coli, Enterobacter and Pseudomonas.\(^3\) Our patient had two risk factors including history of diabetes and recurrent urosepsis. Patients with emphysematous gastritis are usually symptomatic and may present with sudden acute abdominal pain, hematemesis, fever, leukocytosis or septic shock with sign of instability and systemic toxicity.\(^4\) Emphysematous gastritis is an emergency condition which needs to be considered in differential diagnosis of acute abdomen especially in presence of risk factors and needs urgent CT abdomen for early diagnosis and intervention.\(^5\)

Compared to gastric emphysema which is a benign condition caused by disrupted mucosa and secondary air entry to the wall due to variable causes like after endoscopy, extension of pneumomediastinum or pneumothorax, severe vomiting or pneumatosis cystoides.\(^2\) However the patient remain asymptomatic and condition will resolve spontaneously.

Both emphysematous gastritis and gastric emphysema can be manifested in plain abdominal radiograph as linear thin lucencies along the stomach wall.\(^2,5\) CT is the most sensitive method and the best diagnostic modality which helps to differentiate further between them as emphysematous gastritis is usually associated with thickened gastric mucosal folds and edema along with cystic pockets of air in the gastric wall and sometimes air in the gastric venous drainage and portal vein in severe conditions.\(^2,4,5\) CT also helps to exclude the other differential diagnosis of acute abdomen like acute pancreatitis or perforated viscus.\(^2\) Plain radiograph of the
abdomen of our patient showed a grossly distended stomach without signs of pneumoperitoneum or small bowel obstruction (Figure 1). CT scan was requested to exclude the possibility of gastric outlet obstruction. It showed grossly distended stomach with mild thickened wall and extensive intramural air involving fundus, body and pyloric region (Figure 2A, 2B). Multiple air loculi were seen within the draining perigastric veins (Figure 2C) and within the intrahepatic portal vein in the left lobe of the liver (Figure 2D).

Patients with gastric emphysema are usually asymptomatic and have a benign course compared to the patient with emphysematous gastritis, in which most of them are clinically ill and need urgent management. The mortality from emphysematous gastritis is more than 60% and the non-lethal complication like gastric strictures is up to 25%. Early non-operative medical management with good hydration, broad-spectrum intravenous antibiotics and bowel rest improve the clinical outcomes. Surgery is not indicated in acute setting even in the presence of portal venous air or pneumoperitoneum as it is associated with increased mortality and post-operative complications like anastomotic leak and fistula formation. Surgery is indicated in case of clinical deterioration, peritonitis, gastric infarction, perforation or failed medical management. Our patient underwent emergent exploratory laparotomy as his condition deteriorated, it showed completely gangrenous stomach in which a total gastrectomy was performed. Early detection and management of emphysematous gastritis based on clinical presentation and CT findings will improve the clinical course and reduce the mortality and morbidity.

Disclosure
The reporting of the current case does not contravene with the regulations of the local institutional review board. No conflicts of interest declared concerning the publication.

Authors’ Contributions
AA collected the clinical data, medical images, did the literature review, wrote the manuscript draft, and editing after review. SBR reviewed the manuscript drafts before submissions with error correction. AM chose the appropriate images and wrote the captions and citations.
References:


Figure 1: Plain radiograph of the abdomen of a 67-year-old male patient anteroposterior supine view shows grossly distended stomach (black arrows) without signs of pneumoperitoneum or small bowel obstruction.
Figure 2: Non-contrast computed tomography scan of the abdomen of a 67-year-old male patient
from (A-D): A,B) Axial image at upper pole of right kidney and coronal image obtained at mid
abdomen level show grossly distended stomach with tiny bubbly intramural air (blue arrows) and
mild perigastric fatty streakiness (orange arrows). C) Axial image at mid renal pole shows
minimal air within perigastric draining vein (green arrows). D) Axial image obtained at level of
gall bladder fossa shows peripheral branching linear lucencies in left lobe of liver consistent with
portovenous air (black arrows).